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Annual Report

Prairie farm rehabilitation
and related activities

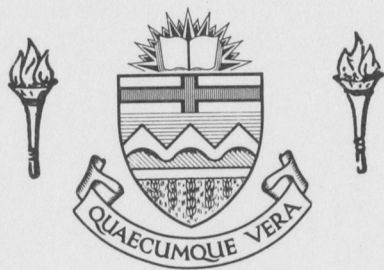
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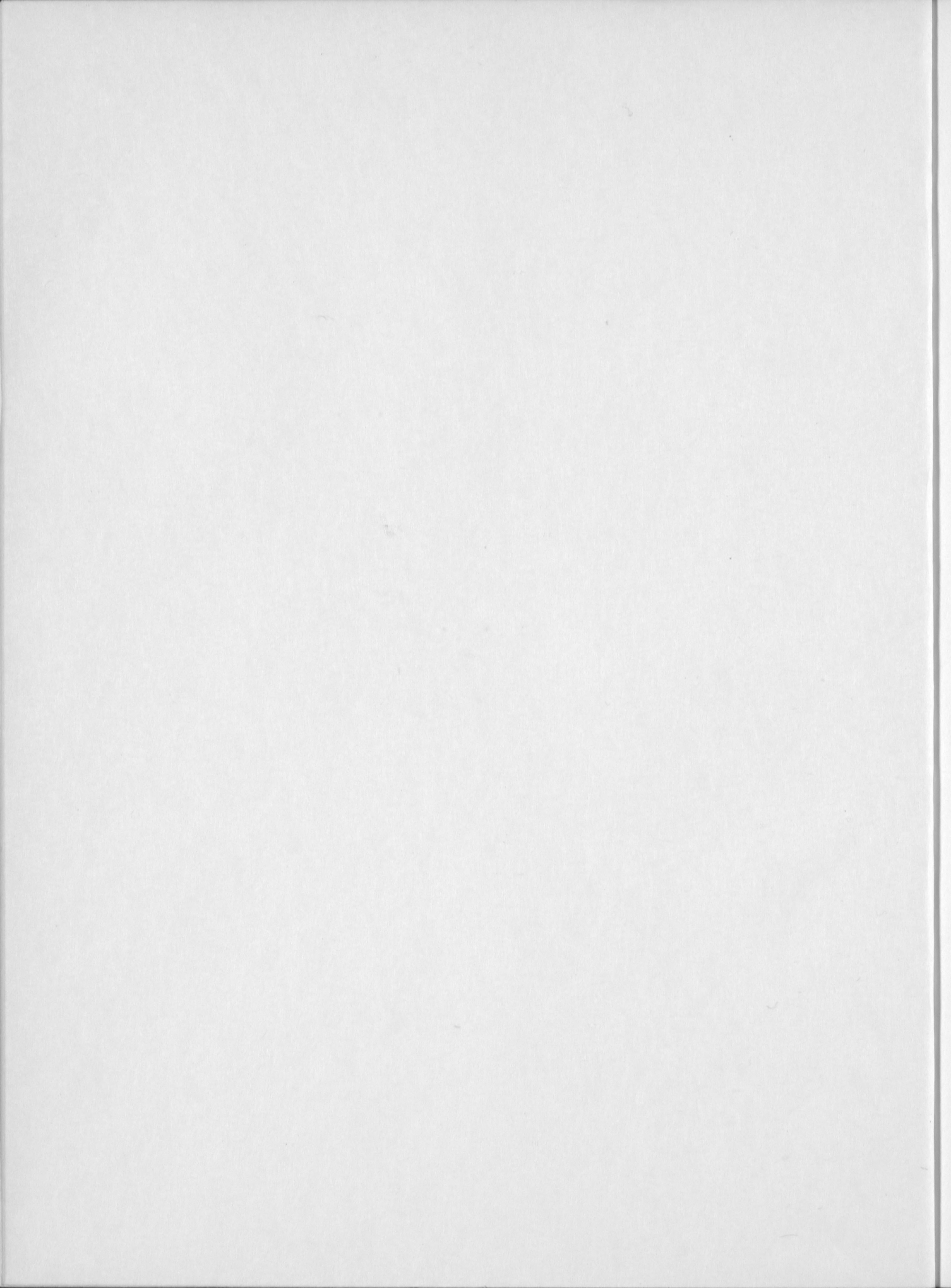
CANADA DEPARTMENT OF AGRICULTURE

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ANNUAL REPORT

ON PRAIRIE FARM REHABILITATION

AND RELATED ACTIVITIES

1963 - 1964

ANNUAL REPORT
ON PRAIRIE FARM REHABILITATION
AND RELATED ACTIVITIES
1983-1984

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INTRODUCTION

The Prairie Farm Rehabilitation Act was passed by Parliament in 1935 to provide for the rehabilitation of drought and soil-drifting areas of Manitoba, Saskatchewan and Alberta. It was amended in 1937 to include land utilization and resettlement, and again in 1939 to extend it indefinitely.

Originally, the Act provided assistance for conserving and reclaiming land and water resources throughout the southern plains area of the Prairie Provinces. This has been done mostly by establishing community pastures on land unsuited to cereal crops and by conserving runoff water through the construction of dugouts or by damming prairie streams. More recently, the program has been extended to the whole of the settled agricultural area of the Prairie Provinces. In addition, PFRA has been made responsible for developing large-scale irrigation and reclamation projects for the federal government, and since the passing of the Agricultural Rehabilitation and Development Act in 1961, has been increasingly active in initiating this program in the four Western provinces. As well, on April 1, 1963, PFRA took over the tree nurseries at Indian Head and Sutherland, Sask., previously under the Research Branch of the Canada Department of Agriculture.

These activities are administered by a Director with headquarters in Regina, who is responsible to the Deputy Minister of Agriculture in Ottawa. The following is a resumé of PFRA activities in the 1963-64 fiscal year.

P.F.R.A ORGANIZATION

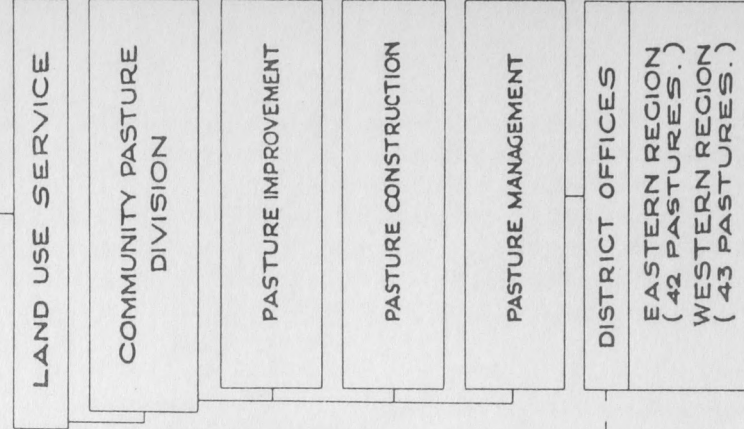
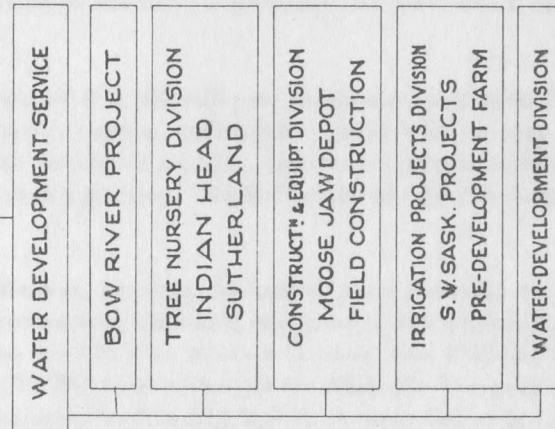
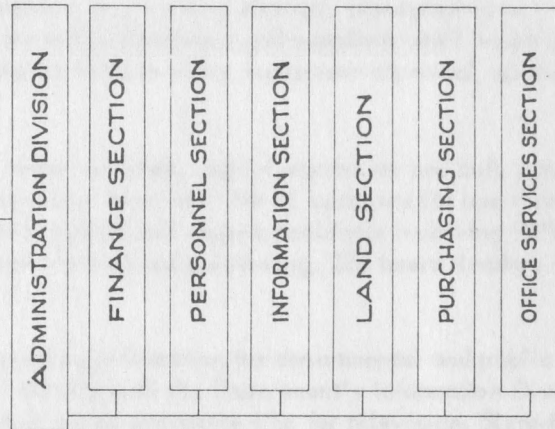
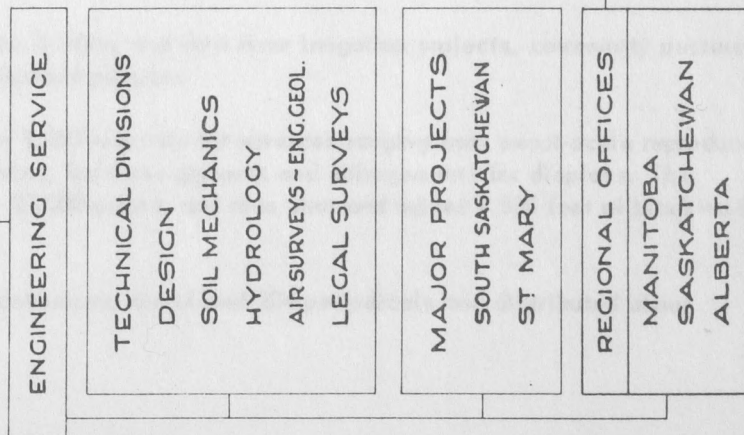
October 1, 1964

MINISTER
DEPUTY MINISTER

DIRECTOR
DEPUTY DIRECTOR

LEGAL OFFICE

ASSOCIATE DIRECTOR (OTTAWA)



ADMINISTRATION DIVISION

Administration of PFRA according to the acts, regulations and policies is carried out by this division through the following units:

The Personnel Unit services a staff of 1,200 full-time employees, and up to 600 seasonal and casual workers at the peak of the construction season. Additional responsibilities were transferred to it during the year from Ottawa. Also, the unit developed branch programs to improve techniques in promotion competitions, counseling, recruiting and staff selection. The full effect of these innovations will be felt the coming year.

The Finance Unit prepares estimates, controls the budget, pays accounts and receives revenues; processes pay lists, travel claims and construction contracts; and directs the accounting in the field offices. It also provides financial services for ARDA in Western Canada. The 1963-64 budget of PFRA exceeded \$32 million. Estimates of \$29,600,000 were submitted for 1964-65. The year's revenues, mainly from community pastures and irrigation projects, totaled \$1,850,000. A study begun in late 1963 is aimed at greater use of financial and cost records for program planning, cost accounting and related techniques.

The Office Services Unit, in addition to providing clerical, stenographic and other office services at headquarters, is responsible for office equipment and supplies, staff housing and office accommodation for PFRA as a whole. Special duties include office equipment appraisal, space planning studies, and systems and procedures reviews.

The Purchasing Unit provides motor vehicles, capital equipment and bulk purchases of construction materials and supplies. It maintains a current list of suppliers for use throughout the PFRA area, finds new sources of supply, and investigates and reports accidents involving PFRA vehicles and motorized equipment. In 1963-64, with semi-centralized purchasing, 224 formal tenders were processed, valued at \$973,000.

The Information Unit, while providing information for departmental and public use, gave emphasis during the year to working more closely with the Department's Information Division in Ottawa. This resulted in a wider distribution of radio tapes and movie film for television. Sixty-five news items were issued as press releases, feature articles, television scripts and radio tapes. Displays were sent to 27 Class A and B fairs, several to special meetings and one to the Royal Winter Fair in Toronto.

Five new brochures covered the St. Mary and Bow river irrigation projects, community pastures, tree nursery stations and the water development program.

The photographic section met 1,150 requests for services ranging from exact-scale reproductions for the engineering divisions to movies, field assignments and enlargements for displays. The section took 5,000 photographs and made 27,000 prints, and also shot and edited 7,500 feet of black-and-white and color movie film.

The library processed 1,013 accessions, circulated 204 periodicals and distributed about 80,000 brochures.

The Land Section secures land control for PFRA projects, administers this land and keeps records on it. Land under PFRA jurisdiction included the following:

LAND INVENTORY ON MARCH, 31, 1964

Projects	Title	Easement Lease, etc.	Total
(acres)			
Water conservation and reclamation:			
Alberta	198		
Saskatchewan	30,639	1,494	
Manitoba	3,476	74	35,881
Minor irrigation:			
Maple Creek	11,004		
Swift Current	16,350		
Val Marie	10,440		37,794
Major Irrigation:			
St. Mary River	13,806		
Bow River	107,365		
South Sask. River	59,170	54,684	235,025
Community pastures:			
Saskatchewan	1,235,283	437,792	
Manitoba	2,061	318,183	
Alberta		142,720	2,136,039
Total	1,489,792	954,947	2,444,739

WATER DEVELOPMENT SERVICE

This service gives financial and technical aid for construction of farm and community water conservation projects, and for large water storage and irrigation works where there is special need. It also administers irrigation projects owned and operated by the federal government in southwestern Saskatchewan, the Bow River project in Alberta and the Irrigation and Demonstration Farm at Outlook, Sask. The service also includes the Equipment and Maintenance Division with headquarters at Moose Jaw, and the tree nursery stations at Indian Head and Sutherland, Sask.

Field Services

The 1963 season opened with light runoff in most of the PFRA area for an average of six days starting in the third week of March. Most farm dugouts and dams had ample water and the majority of PFRA community projects were filled. This was followed in most prairie areas by good rainfall throughout the growing season. As a result, requests for construction of farm projects declined from the previous year and no urgent maintenance of projects was needed. This freed staff for a heavy program of construction on new community projects, which continued to the end of the year.

Activities in the newly established northern districts continued to increase as more farmers became aware of the program. The Westlock area showed particular interest requiring the use of a mobile field survey unit. Also, future development of several large dams in the area was investigated.

Field services in 1963-64 are shown in the following table.

Type of Project	Preliminary calls	Inspections		Number of surveys	Plans prepared	Total services
		Final	Other			
Dugouts	1,801	3,348	1,436	—	—	6,585
Stock watering dams	491	434	641	548	568	2,682
Irrigation	815	318	1,071	518	502	3,224
Community	227	75	704	41	18	1,065
Combined	3,334	4,175	3,852	1,107	1,088	13,556

Total expenditure on individual projects: \$889,733.33

Total expenditure on small community projects: \$121,599.32

Dugout pumping. This program continued in areas of need; 216 farm projects were served by pumping an estimated 48 million gallons of water.

Emergency community well drilling. This was concentrated in Saskatchewan, where 32 wells were constructed and approved for payment at a cost of \$59,881.07, averaging \$1,871 per well. The federal government's share was \$20,958.37.

Large Water Storage Projects

Construction was carried out on eight large developments, as follows:

Conjuring Creek. The contract for construction was awarded in October, 1963. This creek flows from the western end of the Riding Mountain in Manitoba. Specifications call for building a dam 20 feet high and 1,000 feet long, capable of storing about 1,000 acre-feet of water. It was too late for the contractor to start before freeze-up, but much of the material was purchased during the winter for an early start in the spring.

Stephenfield Dam. Work started in 1962 and it was completed in 1963. Located on the Boyne River about 12 miles upstream from Carman, Man., the project was requested to overcome a chronic water shortage. It includes a gated riparian conduit and timber chute spillway, and is designed to store about 3,600 acre-feet of water.

Mossy Dam. The contract was awarded in October, 1963, for a concrete control structure on the Mossy River at the outlet from Lake Dauphin, Man. Its purpose is to improve control of the lake's level. Because of the lateness of the season, the contractor postponed the start until the spring of 1964, but purchased materials and prefabricated some components during the winter. By starting as soon as possible after spring break-up, he planned to meet the completion date of July 31, 1964.

Theodore Dam. Located on the Whitesand River 25 miles northwest of Yorkton, Sask., this is a multipurpose project with a capacity of 12,000 acre-feet of water. It will provide benefits along 40 miles of river channel downstream from the reservoir. The project consists of an earth-filled embankment 45 feet high and 1,200 feet long, with a concrete chute spillway and riparian outlet. Construction started in the fall of 1962 and was scheduled for completion in July, 1964.

Avonlea Creek Storage. This is a community water storage dam and reservoir constructed on Avonlea Creek, a tributary of Moose Jaw Creek, about 35 miles southeast of Moose Jaw, Sask. The reservoir can hold 6,000 acre-feet of water and will replenish several small irrigation projects, stock watering reservoirs and dugouts through 60 miles of stream channel. It includes a 45-foot high, earth-filled embankment, a drop inlet spillway and riparian outlet. Construction began in the fall of 1962 for completion in the summer of 1964.

Summerville Dam. Located on the Wood River in southwestern Saskatchewan, this dam provides water for downstream irrigation and stock watering in the Mankota area. Improvements have increased the reservoir's capacity to 1,600 acre-feet, and added a permanent, concrete chute spillway through the north abutment. The work was completed in November, 1963.

Welwyn Dam. The contract was awarded on February 6, 1964 for a medium-size water development project to store about 400 acre-feet. Located on Beaver Creek 1½ miles northeast of Welwyn, Sask., the structure is to improve water supplies in the creek for stock watering and other riparian use. Construction will commence in the spring.

Carolside Dam. Construction of a spillway at the dam on Berry Creek near Carolside, Alta., started in the fall of 1962 and was completed in 1963. The new structure raises storage capacity in the Berry Creek reservoir to 30,000 acre-feet, sufficient to irrigate about 10,000 acres of land downstream.

Irrigation Projects

These projects are developed, operated and maintained by PFRA.

Rehabilitation, Southwest Saskatchewan

Six irrigation projects and 25 reservoirs are controlled by PFRA in this region. The six projects are at Val Marie, West Val Marie, Eastend, Consul, Maple Creek and Swift Current, covering 25,000 acres of developed, irrigable land. Another 15,000 acres operated by the province or under private lease receive water from PFRA reservoirs. The main product of most of this land is forage to feed range cattle in winter and to maintain breeding herds so that grazing resources may be properly used.

Two major problems on the projects are rough terrain and canal seepage. Both conditions tend to saturate the soil, causing alkaline salts to rise to the surface and producing poor yields. This demands a continuous program of improvement. During 1963, 1,450 acres were scraper-levelled by the Parkinson method and several canals were lined. The program has doubled or tripled production on large acreages of irrigated land, in spite of water shortages in some areas.

Meetings were held on the projects to discuss the formation of water users' associations, with a view to transferring the projects eventually to local water users. Associations would finance the operation and maintenance of projects by gradually increasing water charges from \$1.50 to \$3 per acre over the next five years.

Bow River

The irrigation season lasted from April 29 to October 23. Consumption of water remained about the same. Water storage was below average at the close of the season, but there was sufficient to meet any possible irrigation demand in the following spring.

Canals and drainage ditches were sprayed with 2,4-D, and a mixture of 2,4-D and 2,4,5-T was used for the first time to control brush and trees in the Arrowwood district. Submerged aquatic weeds were treated experimentally with Aqualin for a second year with satisfactory results. Emergent water weeds were sprayed with a mixture of dalapon and fenoprop, which gave better control than the 2,4-D in an emulsion of diesel oil and water used in 1962.

No major structures were built. The program of replacing old wooden structures was continued and several miles of lateral canals in the Hays district were straightened or replaced to improve irrigation efficiency. Sections of canal in the Vauxhall district were lined with polyethylene film to prevent water conveyance losses and reclaim adjacent land that was waterlogged.

In the Hays community pasture another 300 acres were leveled for irrigation. A second pump was installed to supply water to 300 acres leveled in 1962.

For the first time, the Alberta Land Development Service took over supervision, surveying and planning of the land leveling program. Extension is the province's responsibility and PFRA has gradually withdrawn from this field.

Agricultural Operations. Crop yields on the project were generally good although the quality of hay suffered through heavy rains during harvest. The acreage sown to sugar beets doubled and production of canning peas and beans increased. Potato acreage stayed constant, but total production increased with wider use of fertilizers and better techniques. There was some interest in growing fresh vegetables but progress was slow. Market development, packaging, handling and distribution need a more aggressive approach.

With plentiful supplies of feed grown in other prairie areas, the price of hay was low and there was more local feeding of livestock than for several years. There was renewed interest in swine, with several farmers enlarging and improving their buildings and equipment for hog raising. No surplus hay remains in the district as the unused feed was dried and sold to processors.

A starch plant opened at Vauxhall in 1963 helped to bolster returns to potato producers. It processes cull and low-grade potatoes.

Settlement. Land settlement is drawing to an end. No new farmers were allocated land and extensions to the project were used for community pastures. A few settlers left the project and their parcels were divided among 13 farmers remaining. On December 31, 1963, there were 142 resident farmers at Hays. Advances made to farmers in the district to assist in purchasing buildings, materials, livestock and fencing amounted to \$20,500.99, bringing total expenses under this program to \$157,007.69 at December 31.

Irrigation Demonstration Farm

A wide selection of field crops were grown on the Predevelopment Farm to demonstrate the types of irrigated crops that are successful in the Outlook area. The irrigation techniques were as varied as possible for the same purpose.

Corn was the most successful of the specialty crops grown for silage. It matured quite early and yielded about 20 tons of green silage per acre. This was placed in a bunk silo and used late in the fall to finish feeder cattle at the station. A larger acreage of corn was planned for the following year. Potatoes also proved quite successful, yielding 10 to 12 tons per acre.

The mechanical grazing experiment started in 1961 was continued. An excess of alfalfa caused the death of one animal, but this fault was rectified by changing from straight alfalfa to a brome-alfalfa mixture and green oats. Plans are under way to develop a pasture of similar size for comparing mechanical grazing with regular pasturing.

Project Maintenance and Construction

This section employs a regular staff of 75 to 80 with casual help as needed.

The Equipment and Supply Depot, Moose Jaw, made repairs ranging from relatively minor work on cars to overhauling heavy, earth-moving equipment. A total of 375 jobs of this nature were undertaken at a cost of \$118,857.54. The trade shops manufactured many items including trailers, water troughs, precast structures, furniture, etc., mainly for community pastures. Most of the work was done in winter to employ construction staff based in Moose Jaw.

Construction crews worked on 125 projects at a cost of \$151,343.27. This was mostly maintenance and improvement work on irrigation projects in southwestern Saskatchewan and on community dams where local contractors were not available. Larger undertakings, using PFRA forces, included construction of a second dam to store water at the Tree Nursery Station, Indian Head, and a new pumping plant and pumphouse on the West Val Marie project.

Tree Nursery Stations

The stations at Indian Head and Sutherland distributed 5,056,000 deciduous and 174,000 coniferous trees to 5,086 farmers in the spring of 1963. This was 31 percent less than in 1961 and 17 percent less than 1962, mainly as a result of severe drought in 1961, which sharply reduced production in the following year. Among farmers, Saskatchewan had 74.5 percent of the trees, Manitoba 23.3, Alberta 2.1 and the Peace River district 0.1. Of these, 39 percent were for field shelterbelt plantings (722 miles) and the remainder for farmstead shelterbelts. Federal, provincial and municipal plantings took eight percent of the 1963 distribution.

Field operations for the culture and production of tree seedlings extended from mid-April to late October. Harvesting and storage of deciduous trees took place in late September, October and November. Over 8 million plantings were produced from the 1961-62 sowings for distribution in 1964. Production of 10 million trees will be possible through land improvement carried out over the past two years. The second storage dam built at Indian Head during the year will also help to increase and ensure production in dry periods through irrigation.

Investigations continued at Indian Head, including herbicide and insecticide tests, seed and storage studies, propagation and performance trials, defoliation and dates of planting.

LAND USE SERVICE

This service is responsible for development and operation of community pastures. The program started in 1937 and interest in it has increased as new and growing demands for land use adjustment and for more and better pastures have come to the fore.

Pasture Operations

There were 75 pastures serving 7,229 patrons in 1963. Livestock handled were 141,008 cattle, 473 horses and 3,652 sheep. The losses were 799 cattle and horses dead or missing, and 75 sheep dead. This was slightly over 0.5 percent of the livestock pastured.

Three new pastures were opened at Kelvington and Foam Lake in northeast Saskatchewan and at Mulvihill, 100 miles north of Winnipeg. The 15,000 acres at Mulvihill were constructed by PFRA for the province some years ago, but PFRA took over the management in 1963.

A fourth new project was created by dividing the 65,200-acre Royal community pasture west of Prince Albert, Sask., into two separate units. The east half retains the name of Royal; the west half was named Meeting Lake pasture. Another 8,800 acres were fenced in 1963 and each pasture now has about 36,760 acres.

Grazing was generally satisfactory. However, there was very little precipitation in southwest Saskatchewan and southeast Alberta after July, 1963, and with little or no runoff in this area in 1963 and 1964, a critical water shortage has developed in a number of pastures.

To cope better with the rapidly increasing size of pasture operations, another supervisory territory was established in northwest Manitoba with headquarters at Dauphin. The other districts are centered at Brandon, Weyburn, Regina, Swift Current, Kindersley and Saskatoon. The seven districts are divided into eastern and western regions by a line running north and south near Moose Jaw.

Grazing Allocation and Fees

Several policy changes and increases in grazing rates and breeding service fees took effect in April, 1963. PFRA assumed responsibility for grazing allocations in 1964, based on need, proximity to pasture and past patronage. A deposit of \$2 per head is required before adult cattle are accepted, and this is credited against grazing fees at the end of the season. Changes in allocations and other minor changes will be made gradually over 3 to 5 years to minimize any adverse effects. New grazing rates include a one percent per head per day tax levy to be handed to rural municipalities, local improvement districts, etc., to compensate for loss of tax revenue on community pasture lands. Fees for 1963-64 were (per head):

Cattle 6 cents per day (including 1 cent tax levy)

Horses 8 cents per day (including levy)

Sheep 12 cents per month (provide own herder)

Cows \$5 (breeding service)

Calves \$4 (of current year, sucking with dam, born before August 1)

Colts \$5 (of current year, sucking with dam, born before August 1)

Minimum grazing fees per head per season are : cattle \$5, horses \$7 and sheep 40 cents.

Hay and Feed Grain

About 5,600 tons of green feed were harvested on community pastures in 1963. In addition, 28,000 bushels of oats were harvested at Monet, Beaver Hills, Wellington and Bitter Lake, where oats were seeded to prepare for grassing. This hay and grain feeds the bulls and headquarters stock.

The fire hazard was critical in the fall of 1963 owing to the good stands of grass and dry weather. But there were only a few small fires caused mainly by lightning.

Motorized units working out of Moose Jaw maintained 1,165.5 miles of fireguards and constructed 32 miles of roads in 28 pastures. Also, several miles of roads in other pastures were maintained by hiring equipment and by managers using pasture equipment. No buildings were destroyed by fire: all have approved fire extinguishers ready for immediate use.

Insurance

Forty-three pastures have adopted a form of mutual insurance that covers most losses, except those due to contagious diseases and parturition. The premiums vary from 35 cents to \$1 per head. Three pastures were covered by a Saskatchewan Government Insurance policy, which was optional to patrons, and 29 pastures had no form of insurance.

Livestock Diseases

No serious outbreaks of disease occurred in community pastures. Several pastures had more cattle than usual infected with pinkeye and footrot, which made extra work for management in treating them. Some pastures were involved with the Health of Animals Branch in the control of brucellosis and tuberculosis, entailing extra work in rounding up cattle and working them through the corrals to obtain blood samples for the brucellosis test and to inoculate for tuberculosis.

Breeding Service

A total of 1,578 bulls were used in community pastures during 1963. Of these, 1,131 were PFRA bulls and the remainder were rented from pasture patrons. They served 44,239 cows. Also, five artificial insemination projects were conducted at Kindersley, Eagle Lake, Laurier, Wellington and Coalfields pastures, serving 1,718 cows. PFRA supplied the facilities, clean-up bulls and semen at Kindersley and Eagle Lake. The artificial breeding co-operatives at Kindersley, Weyburn and Estevan handled all other aspects of the operation, charging \$5 to \$7 per cow.

To meet pasture requirement, PFRA bought 240 yearling bulls and 175 bulls of two years and over. They came from 89 purebred breeders in Saskatchewan and Manitoba, and five bull auctions including Regina, Brandon, Weyburn, North Battleford and Swift Current. The yearling bulls were bought in May and June and moved to the Archie and Bitter Lake bull stations for a year before being put into the breeding service. The other bulls went straight to the pastures and were used for breeding in 1963.

In the previous fall, 246 bulls unfit for service were sold for slaughter. There were 32 bull casualties during the pasture season.

Construction and Improvement

Eight crews worked on construction and five on pasture improvement and maintenance during 1963.

Construction. This included building 287 miles of fence, 7 corrals, 2 pasture dwellings and 19 miscellaneous buildings for pasture headquarters. The largest task was the construction of eight new pastures which were ready for partial operation in 1964. The locations and fenced acreages are:

Saskatchewan – Spiritwood (13,280) north of Spiritwood,
Hazel Dell (14,240) northwest of Yorkton,
Cowessess-Sakimay (7,037) northeast of Broadview,
Ochapowace-Kahkewistahaw (7,832) northwest of Broadview.

Manitoba - Pasquia (1,380) southwest of The Pas,
Duck Mountain (21,440) northwest of Dauphin,
Lenswood (17,064) northeast of Swan River,
Narcisse (9,280) north of Winnipeg.

Improvement. Pasture improvement was concentrated on irrigation development, grass seeding, development of stock watering facilities, land clearing and brush control. Seventy acres were developed under the border dike system of irrigation and 400 acres for flood irrigation. Crews prepared 3,500 acres and seeded them to grass, and developed 122 new stock watering sites. Land was cleared on 10,000 acres, including 7,000 acres by the ball-and-chain method, 1,000 by blade-crusher equipment and 2,000 by conventional means. Aircraft sprayed 5,000 acres along fence lines and incleared areas to control brush. The vegetation was mainly willow, aspen and western snowberry.

ENGINEERING SERVICE

This service provides the engineering for the investigation, planning, design and construction of PFRA projects. It also assists other agencies such as the International Joint Commission, the Prairie Provinces Water Board and the Greater Winnipeg Floodway Advisory Board.

The major planning and design work for PFRA is done at the Regina headquarters and the Soils Mechanics and Materials Division in Saskatoon. Regional engineering offices in the three provinces provide services for field investigations and supervision of construction and the operation of projects. Special project offices are set up as needed to supervise investigations and construction on large irrigation projects such as the St. Mary and South Saskatchewan rivers.

Design Division

A large part of the year's work was on the South Saskatchewan River project, involving planning, designing, and preparation of specifications and plans for contracts. Plans and specifications were prepared and contracts advertized for water storage on the Conjuring Creek and Massy River projects in Manitoba and the Welwyn Dam in Saskatchewan. The division also drew up plans for a pumping plant at Gravelbourg and for changes at the West Val Marie pumphouse, which were built by PFRA staff.

Other plans were for construction of Drain E in the central block of the Bow River project, and preliminary designs were completed for renovation or replacement of the inlet structure for the East Arrowwood syphon. Two large water conservation schemes in Alberta and Manitoba - Sarnia and Shellmouth - needed considerable designing, as did several smaller structures. Other jobs included checking quantities for completed contracts and making preliminary investigations into projects under consideration.

Hydraulic Laboratory

Most of the model work was for studies of the South Saskatchewan River project, including the design of the spillway approach channel and crest abutment, the river closure operation and possible modifications to the outlet basin for Tunnel No. 4.

Air Photo Analysis and Engineering Geology Division

Engineering geology studies were completed on Penticton Creek, B.C.; Oldman and Paddle rivers and Pincher Creek, Alta.; Beaver and Swan rivers, and Moose Mountain Creek, Sask.

Preliminary air photo studies were made for selecting damsites on Paddle River, and at Skull Creek and Foam Lake R.M., Sask. Detailed air photo studies were completed for two community pastures at Sakimay-Cowessess and Ochapowace-Kahkewistahaw near Broadview, Sask. Brief air photo studies were made for 11 ARDA community pasture proposals in Alberta.

Photogrammetric maps were made of parts of the Beaver, Swan, Qu'Appelle and Makwa rivers, and Skull and Meeting creeks, Sask.; Valley River and Wilson Creek, Man.; and Oldman River, Parlbay Creek and Paddle River, Alta.

Of special interest were air photo enlargements made of the reservoir area of the South Saskatchewan project to aid in planning the brush clearing program; also a set of maps scaled at one inch per mile for all PFRA community pastures in Manitoba.

New air photo coverage of the Buffalo Pound Lake area was acquired through the Interdepartmental Committee on Air Surveys. Existing small-scale coverage of extensive areas in north-central Alberta and Saskatchewan was purchased from National Air Photo Library.

Soil Mechanics and Materials Division

Investigations included 37,000 feet of drilling on 22 projects. Over half of this was for the South Saskatchewan River project and Shellmouth Dam on the Assiniboine River project.

The laboratories tested soil samples from test drill holes, sand and gravel samples from pits and stockpiles, and construction materials such as cement, waterstop and steel reinforcing submitted for acceptance under contract specifications. Field laboratories were maintained at Waterton, Stephenfield and Theodore dams for construction control tests to guide resident engineers.

Investigation and design reports were prepared for 13 projects, and reports on eight special laboratory or design studies. Construction plans and specifications were prepared on earthwork, concrete and cement for projects, including the Qu'Appelle River Dam and final embankment stage of the South Saskatchewan River Dam. As in previous years, a continuing inspection program was maintained to measure and record the performance of embankments and structures, either completed or under construction.

Hydrology Division

The division provides information on stream flow, climate and watershed development potential, and is also the secretariat of the Prairie Provinces Water Board and hydrologic advisor to PFRA staff with the international water boards. These duties entailed 99 investigation or studies during the year.

The investigations dealt with the flood potential of streams for spillway design, optimum reservoir size for adequate stream regulation, preparation of climatic maps to aid irrigation land classification, study of water development potential in complete watersheds, forecasting of stream flows for construction work and related matters.

Information on prairie stream flows and meteorological parameters is limited. To make the best use of it, and hence make hydrologic studies more reliable, the division studied regional hydrologic characteristics. The floods of the mid-1950's created active interest in flood potential, and to cope with many requests for information, good use was made of a report on "The Magnitude and Frequency of Floods in Alberta, Saskatchewan and Manitoba," which the division completed recently. In the 1960's the sequence of low runoff years has stimulated interest in stream-flow reliability and low-flow characteristics. To meet this interest in drought, the division completed this year an extensive study of all prairie stream-flow data to develop regional patterns of water yield and variability of runoff.

For similar reasons, regional studies have been completed on probable maximum precipitation, maximum persisting dew points, depth-area-duration characteristics of great rainstorms, evaporation, and relationships between air and reservoir water temperatures.

The division also became the secretariat of the Saskatchewan-Nelson Technical Advisory Committee established early in 1963. The committee will prepare a study outline showing how the waters of the Saskatchewan-Nelson system may be augmented by storage and/or diversion.

Surveys Division

Since 1962, all request for legal surveys in Alberta have been contracted to private firms. In Saskatchewan they are done by the Surveys Division of PFRA. Contracts awarded to private firms in 1963-64 included legal surveys for drains, reservoirs and damsites on the St. Mary Irrigation project and various water development projects. The four contracts totaled \$7,000.

Division staff completely revised the survey of the Maple Creek Irrigation project covering 56 quarter-sections and including re-subdivision, retracements, supply and drainage rights-of-way, access roads and road diversions. Retracement surveys were also made on 48 miles of interior and exterior Indian Reserve boundaries before construction of new pastures on the Ochapowace, Kahkewistahaw, Cowessess and Sakimay reserves. The final survey and plans will be completed after the pastures are in operation.

Other surveys were made for rights-of-way at Gainsborough community project and Highfield and Lightning Creek reservoirs, for relocating the Swift Current main canal and subdivision in the Rush Lake Irrigation District, and parcel surveys at the South Saskatchewan River project and Gull Lake pasture.

The division is compiling a detailed list of all surveys on PFRA projects including, where necessary, the areas of each parcel affected.

Regional Offices

The regional engineering offices carried out a broad program of investigation, construction, operation and maintenance of water development projects. The more important ones are reviewed briefly.

Assiniboine River

Most of the work on this river was dike improvement and topographic surveys. About three miles of dike in six locations were widened and raised, and rock protection was placed along the toe of 1,500 feet of eroding bank. Three short ring dikes were built to protect farm homes near St. Francis Xavier, and three drains were excavated to accelerate removal of flood water. Five gated-culverts were run through dikes and minor repairs were made to Mill Creek control structure. To stabilize dikes and prevent erosion, 3,500 rooted willows were planted and grass was seeded on about 45 miles of dike and borrow pits.

Work on the Shellmouth project was mainly to continue general topographical surveys at the damsite and reservoir, construction of a test fill at the damsite and additional hydraulic studies in the Winnipeg office. Surveys included drill hole ties, layout and control surveys of test fill, checking control levels and detailed surveys of five existing valley crossings upstream from the dam.

The test fill, built in six weeks ending in mid-November, was 235 feet by 850 feet at the base and 55 feet high. Test apparatus installed during construction continued to record through the winter.

Under an agreement, PFRA builds the Shellmouth dam and the Province of Manitoba completes the diversion canal from the Assiniboine River to Lake Manitoba near Portage la Prairie. PFRA and the Manitoba government set up an advisory board to co-ordinate the activities.

Northwest Escarpment and Interlake

Work was concentrated on two main projects, as in previous years. The first involved enlargement of seven miles of the Icelandic River channel downstream from Arborg, which was finished in 1963. Provincial engineers supervised the project, which was based on flood control proposals made by PFRA, and the two governments shared the costs equally. Work remaining in 1963 included completing a traffic bridge across the channel, completing several land transactions, and cultivating and seeding the development to grass.

The other major activity was in the Wilson Creek experimental watershed, which was initiated in 1957 on an equal cost-sharing basis with the Province of Manitoba. Its purpose is to learn more about flash floods and heavy sedimentation characteristics of many streams originating from the east slopes of the Riding, Duck and Porcupine mountains. Weather and hydrometric observation stations have been established in the headwaters of Wilson Creek, access roads and trails built, two headwater storage reservoirs developed, and surveys of geological, botanical and topographical features of the area carried out. Also undertaken were experiments in bank protection, vegetative plots studies, tree planting programs and sediment measurements. The main program on the watershed was again to record data on stream discharge, sedimentation and climatological observations, along with routine operation of the project.

Peguis and Fisher River Indian Reserves Flood Control

On behalf of the Indian Affairs Branch, Department of Citizenship and Immigration, PFRA is investigating prospects for drainage or flood protection on the reserves, with a view to developing agriculture. The field work, including agricultural appraisal and a large-scale topographical survey, was completed before April, 1963. A report on remedial measures for Fisher River was submitted, and two more reports produced in the current year covered the Peguis Reserve and specific, isolated drainage problems.

Pembina-Winkler Storage and Irrigation

The United States, Manitoba and Canadian governments have worked together since 1960 on a comprehensive report. PFRA undertook two phases of the study: development of water storage in the Pembina Valley, Manitoba, and the design of alternative systems of irrigation for the Winkler area. All field work was completed by December, 1962, and the reports were submitted in February, 1964.

Buffalo Pound Water Supply

PFRA installed facilities late in the 1950's to maintain water levels in Buffalo Pound Lake and assure water supplies for Regina and Moose Jaw. This involved pumping water from the South Saskatchewan River and improving storage facilities in the lake. In 1963, 27,000 acre-feet of water was pumped, which helped to meet all demands and to raise the lake's level from 1,671 to 1,672.7. Since the operation began in 1958, over 100,000 acre-feet of water has been pumped from the South Saskatchewan.

Raising the water level and increasing storage capacity are needed to meet expected demands over the next few years, when pumping will be disrupted by flooding as the level in the reservoir is raised by construction of the South Saskatchewan River Dam.

The higher water level in Buffalo Pound reservoir in turn necessitated a new causeway (Highway No. 2) across the north end of the lake. Construction of the causeway jointly by the provincial and federal governments started in 1962 and was completed in the spring of 1963.

British Columbia Project Investigations

Preliminary engineering investigations and a report were completed on rehabilitation of two irrigation projects within the City of Penticton. This would involve some 2,000 acres of irrigable land devoted primarily to tree fruits. The original gravity systems supplying these areas were built about 1905 and badly need replacement if the land is to continue in agricultural production. PFRA investigations included hydrologic studies, geological and foundation exploration of selected storage and diversion dam-sites, inventory of existing works, route studies and cost comparisons of alternative diversions and distribution mains. The reports also considers combining upstream storage on Penticton Creek to serve both irrigation and municipal needs.

Alberta Project Investigations

Preliminary engineering reports were prepared on four projects: Blood Indian Creek, Hanna and Sage Creek channel improvements, and the Western Irrigation District. Investigations continued on the Chain Lakes, Pincher Creek and Bow River projects. Preliminary investigations were started on five other projects; Three Rivers, Paddle River, Donalda, Parly Creek and Eastern Irrigation District.

Blood Indian Creek. This project involves construction of a dam 545 feet long and 48 feet high, with a combined inlet spillway and riparian outlet structure, and a 50-foot wide emergency spillway. The reservoir would hold 3,000 acre-feet of storage for stock watering and irrigation of over 400 acres of creek flats downstream.

Hanna. Three proposals were investigated for additional storage in Fox Lake to assure Hanna's water supply.

Sage Creek. An investigation for channel improvements was made at the request of the Department of External Affairs for the International Joint Commission. This was to assess the cost, usefulness and apportioning of water between Canada and the United States.

Western Irrigation District. A preliminary report was completed on the proposal to renovate the inlet to the the district's "A" system of laterals and the Delroy flume. Further steps await results of a study by ARDA into the operating costs and the benefits of irrigation in Alberta.

Chain Lakes. The project involves construction of two dams to store about 14,000 acre-feet between them. The south dam, a rolled earth fill, is to be 40 feet high and 1,800 feet long; the north dam 47 feet by 1,200 feet. Work was confined to obtaining more building information on the spillway and downstream borrow areas at the south dam, and on conduits at both dams.

Pincher Creek. Surveys and investigations to date indicate that a reservoir capacity of 15,000 acre-feet would be possible by building a dam 117 feet high.

Three Rivers. Field investigations on a promising damsite on the Oldman River indicate that a dam 236 feet high and 1,300 feet long would impound 400,000 acre-feet of water. Preliminary investigations involved topographical surveys of the site, photogrammetric mapping of the reservoir and a seismic survey of the depth of bedrock, using two deep drill holes.

Paddle River. Located about 70 miles northwest of Edmonton, the project was investigated to find potential reservoir sites for flood protection on the Paddle River flood plain and to supply water to Mayerthorpe and Barrhead. Vertical and horizontal control points were established for photogrammetric mapping of two proposed reservoirs on the Little Paddle River. Also, a preliminary hydrology study was made of storage capacities required to alleviate serious flooding.

Major Projects

St. Mary Irrigation

Located in southern Alberta, this project involves the construction of works to irrigate about 500,000 acres extending between Cardston in the southwest and Medicine Hat. By agreement, the federal government is responsible for engineering and supervision of construction of the whole project, and the cost of constructing the main works and connecting canals. Alberta finances construction of the distributory works and is responsible for settlement and all other agricultural development on the project. The federal government also operates and maintains the main reservoirs and connecting canals, and is reimbursed at a maximum rate of 25 cents per acre-foot of water delivered to the province for distribution to the irrigated areas.

Construction began in 1946 and all main works have been completed, except the Waterton to Belly River diversion canal and control works for Waterton reservoir. The distribution works now serve 304,000 acres.

To March 31, 1964, capital expenditure by the federal government was about \$29,815,000, and by Alberta about \$20,084,000. The federal share includes operation and maintenance, and a large portion of this is recovered through the charges for water delivery.

Engineering and Construction. Designs were made for control works of structures on the Waterton Reservoir and the Waterton to Belly River canal. Surveys, investigation, planning and design were continued on structures for the distribution systems still to be built. In addition, a complete redesign of the Lethbridge-Coaldale tract was undertaken. This tract has been in operation for up to 60 years, and structures and canals need extensive replacement.

Construction of the Waterton Dam embankment and spillway was completed. A contract was awarded for construction of part of the Waterton to Belly River canal, and tenders were called for a contract to construct a drainage tunnel for the Waterton Dam.

Improvement and Maintenance. Only minor capital expenditures were needed for altering or adding to existing works on the project in 1963. Maintenance included further construction of drains along the main canal to control seepage, replacement of worn timber bridge decks with concrete, gravel facing of eroded canal sections, and general building and ground maintenance.

Operation. Water delivered from the St. Mary reservoir amounted to 452,000 acre-feet in 1963. The demand was heavy until good rains in June and July reduced irrigation considerably.

A significant development in new areas of the project is the request by farmers for water rights on additional acreage over their classified areas. This contrasts with previous requests for reductions in classified acreage granted in many cases before the dry conditions of the past three years. The acreage irrigated in the new areas rose to 104,900 in 1963 compared with 100,800 in 1962, for a total of about 226,000 irrigated acres on the entire project.

South Saskatchewan River

Located in south-central Saskatchewan, this is a large, multi-purpose, water conservation development that will employ the river for irrigation, power, domestic and industrial water supplies, and recreation. Reservoir control will be achieved by building two dams: the major one on the South Saskatchewan about halfway between Outlook and Elbow, and the other at the divide between the valleys of the South Saskatchewan and Qu'Appelle rivers.

Under the agreement signed in 1958, the federal and provincial governments share the costs of development. The federal government is responsible for all engineering associated with planning and supervision of construction of the dams, and creation of the reservoir, as well as the major share of development costs. The province's principal responsibility is all other phases of development, chiefly in providing facilities for irrigation, recreation and the generation of electrical power.

Design and Planning. The work carried out during the year by the Design and Soil Mechanics divisions was to prepare final plans and specifications for seven contracts covering work on the project. Contracts were awarded for construction of the spillway crest, Qu'Appelle River dam, bulkheads for tunnels and cathodic protection for tunnels (stage 1); also for embankment stage 4, supply of cement and flyash. Considerable preliminary designing was undertaken on the spillway chute and basin structure for a contract to be awarded later in 1964.

Final plans and specifications were prepared and the tenders received for control gates and hoists for the Qu'Appelle and South Saskatchewan river dams, embankment stage 5. Contracts will be awarded early in 1964.

Construction. The major emphasis continued to be on five river diversion tunnels and tunnel control facilities, which are in their final stages. A significant point was reached with completion of the tunnels and diversion of the river through them, making possible the final stage of embankment construction. Satisfactory progress was made on the embankment on the far west side of the river, now 85 percent completed, and on the east embankment, 42 percent completed.

Two other major undertakings were commencement on the crest section of the spillway and on the Qu'Appelle River Dam. The latter structure in the Qu'Appelle Valley about 12 miles southeast of Elbow will contain the main reservoir and control the release of water into the Qu'Appelle River system.

Approximately 64 million cubic yards of earth have been moved at the damsite to date, of which about 39 million cubic yards have been compacted in the embankment. In addition, a large quantity of concrete has been placed during the past year, mostly in the tunnels. The total labor force did not vary greatly, ranging between 800 and 1,000. The value of contract work completed in the year was \$13,512,737, bringing the total work done under contract to \$61,407,349.

APPENDIX I

WATER DEVELOPMENT PROJECTS COMPLETED AND ASSISTANCE PAID, 1935-64

Types of Project	DUGOUTS		DAMS		IRRIGATION PROJECTS		TOTALS	
	Completed	Assistance \$	Completed	Assistance \$	Completed	Assistance \$	Completed	Assistance \$
MANITOBA								
Individual	15,793	2,082,530.40	335	28,351.51	269	108,703.08	16,397	2,219,584.99
Neighbor	75	20,183.03	16	5,024.00	19	11,994.24	110	37,201.27
Small Community	7	12,530.86	25	134,367.47	2	30,582.54	34	177,480.87
Large Water	-	-	29	2,120,142.82	6	617,217.00	35	2,737,359.82
TOTAL	15,875	2,115,244.29	405	2,287,885.80	296	768,496.86	16,576	5,171,626.95
SASKATCHEWAN								
Individual	47,637	6,998,899.47	5,304	542,816.63	2,803	725,747.18	55,744	8,267,463.28
Neighbor	421	133,818.44	60	13,100.42	130	66,020.88	611	212,939.74
Small Community	400	386,788.02	202	1,069,527.17	70	666,247.97	672	2,122,563.16
Large Water	-	-	49	4,161,506.37	35	4,079,910.00	84	8,241,416.37
TOTAL	48,458	7,519,505.93	5,615	5,786,950.59	3,038	5,537,926.03	57,111	18,844,382.55
ALBERTA								
Individual	12,254	1,947,144.57	3,255	384,368.57	1,308	345,400.25	16,817	2,676,913.39
Neighbor	54	19,930.05	16	5,843.50	17	6,567.32	87	32,340.87
Small Community	91	188,877.42	119	748,358.72	55	669,769.14	265	1,607,005.28
Large Water	-	-	6	150,015.00	18	693,004.00	24	843,019.00
TOTAL	12,399	2,155,952.04	3,396	1,288,585.79	1,398	1,714,740.71	17,193	5,159,278.54
GRAND TOTAL	76,732	11,790,702.26	9,416	9,363,422.18	4,732	8,021,163.60	90,880	29,175,288.04

APPENDIX II DEVELOPMENT AND OPERATION OF COMMUNITY PASTURES UNDER PFRA, 1938-64

Fiscal Year	No. of Pasture Units in Operation	Area of Land in Pastures (acres)	Total Cost of Construction of Pastures \$	Livestock Units Carried on Pastures	Acres per Unit of Livestock	Revenue \$	Operating Costs \$	Net Operating cost per Unit of Livestock \$	Average Charge per Unit of Livestock to Farmers \$
1938-39	14	189,800	165,995.03	3,231	58.7	6,339.92	10,185.52	3.15	1.96
1939-40	26	612,300	663,471.25*	11,522	53.1	21,632.71	20,945.84	1.82	1.82
1940-41	35	884,500	1,004,305.91	23,245	38.1	43,451.56	35,291.05	1.52	1.87
1941-42	38	936,548	1,187,360.92	33,230	28.2	65,434.89	50,607.22	1.52	1.97
1942-43	45	1,261,100	1,129,487.54	51,127	24.7	98,292.32	79,906.76	1.56	1.92
1943-44	46	1,268,140	1,558,055.31	54,472	23.3	111,114.25	107,534.66	1.97	2.04
1944-45	49	1,337,320	1,699,012.21	59,997	22.3	151,461.08	117,064.90	1.95	2.52
1945-46	50	1,361,440	1,857,020.37	67,778	20.1	167,045.16	136,567.09	2.01	2.46
1946-47	53	1,412,860	2,072,274.21	68,493	20.6	198,115.27	145,292.51	2.12	2.89
1947-48	53	1,417,320	2,208,919.12	66,347	21.4	203,888.11	161,471.05	2.43	3.07
1948-49	54	1,436,480	2,486,277.28	71,393	20.1	204,012.40	175,666.27	2.46	2.86
1949-50	54	1,439,680	2,809,196.14	70,308	20.5	211,624.23	172,255.25	2.45	3.01
1950-51	56	1,521,080	3,237,330.55	68,858	22.1	221,129.45	217,867.45	3.16	3.21
1951-52	57	1,574,642	3,426,586.10	77,240	20.4	335,327.16	237,742.13	3.08	4.34
1952-53	59	1,652,020	3,754,098.41	94,137	17.5	438,513.75	373,737.36	3.97	4.66
1953-54	60	1,678,736	3,963,572.83	109,583	15.3	507,179.14	490,907.89	4.48	4.55
1954-55	60	1,696,900	4,273,916.79	106,322	15.9	496,805.78	466,153.69	4.38	4.66
1955-56	60	1,728,700	4,509,668.59	108,499	15.8	499,045.13	501,540.73	4.67	4.60
1956-57	61	1,759,570	4,832,863.47	117,441	14.9	548,601.01	508,002.83	4.33	4.67
1957-58	61	1,796,275	5,119,317.01	119,398	15.0	552,938.40	607,129.23	5.08	4.63
1958-59	62	1,815,265	5,509,958.43	117,032	15.5	542,606.90	686,448.88	5.87	4.64
1959-60	64	1,818,464	5,800,342.43	124,812	14.6	705,785.32	742,915.21	5.95	5.65
1960-61	65	1,896,173	6,254,224.42	122,813	15.4	656,708.97	879,811.85	7.15	5.35
1961-62	68	2,088,704	6,845,655.79	146,672	14.2	860,808.25	1,128,255.75	7.69	5.87
1962-63	71	2,114,412	7,283,657.67	139,643	15.1	871,955.43	1,044,241.41	7.48	6.24
* 1963-64	75	2,149,292	7,677,379.13	141,723	15.2	1,168,641.26	1,193,820.31	8.42	8.25
						9,888,457.85	10,291,262.54		

A livestock unit indicates one head of cattle, one horse, or five sheep.

A pasture unit may include one or more pastures, but it is operated under one management.

* Tax levy not included in revenue (1963-64 levy was \$145,630.58).

APPENDIX III
MAJOR PROJECTS - IRRIGATION, RECLAMATION AND WATER STORAGE
 (Projects by Special Votes of Parliament, Administered by PFRA)
 to March 31, 1964

Name of Project	Location	Type of Project	Completed	Irr. Ac.	Stor. Cap. Acre Feet	Costs
MANITOBA						
Assiniboine River Diking & Cut Off	Brandon	River Control	Incomplete	-	-	1,322,744
North-West Escarpment Reclamation Proj. - Riding Mt. Area	Dauphin Lake Manitoba	Watershed Control Flood Control	Incomplete 1960	-	-	1,296,176 287,751
Fairford River Project	The Pas	Reclamation	Incomplete	135,000	-	2,256,388
Saskatchewan River Reclamation - Pasquia Area	Russell	River Control	Incomplete	-	430,000	141,113
Shellmouth Dam & Portage Diversion	Medicine Hat	Irrigation	Incomplete	235,000	408,862	54,398
Bow River (a) Purchase of Canada Land & Irrigation Company (b) Development & Construction	Lethbridge Lethbridge	Irrigation Irrigation	Incomplete 1950	510,000 -	320,000 -	2,353,182 21,688,316 20,221,133 53,901
BRITISH COLUMBIA						
Cawston Benches	Keremeos	Irrigation (pump)	1951	629	2,000	185,491
Chase & Johnston - Western Canada Ranching	Kamloops	Irrigation	1951	755	-	98,243
Western Canada Ranching #2	Kamloops	Irrigation (pump)	1950	54	-	58,069
Lillooet - Pemberton	Pemberton	River Control	1953	-	-	1,056,539
South Thompson - Niskolith Gravity Project	Kamloops	Irrigation	Incomplete	1,030	1,200	12,282
Westbank Project	Kelowna	Irrigation	1950	1,200	2,500	537,450
Bankhead Irrigation Project	Kelowna	Irrigation	1951	92	-	32,229
Penticton West Bench	Penticton	Irrigation (pump)	1953	800	-	66,362
B.C. Fruitlands	Kamloops	Irrigation	Incomplete	2,000	-	200,000

(Above includes ONLY Construction Costs)

Name of Project	Location	Type of Project	Completed	Irr. Ac.	Stor. Cap. Acre Feet	Costs
SASKATCHEWAN						
South Saskatchewan River Project	Outlook	Multi-purpose	Incomplete	500,000 (including 24,000 in Qu'Appelle extension)	-	63,852,941
Buffalo Pound Project	Qu'Appelle Valley	Urban Water Supply	1960	-	42,000	2,200,434
- Eyebrow Lake Diversion	Eyebrow	Water Supply	1960	-	-	98,376

(Above includes ONLY Construction Costs)

	Date Due			
PF				
ADMINISTRATION DIVISION				
Ottawa and Regina A				\$ 3,357,164
LAND USE SERVICE				
Cultural Work - Soil				4,966,394
Community Pastures				25,499,148
Movement of Settlers				227,841
WATER DEVELOPMENT SE				
Small Farm Projects				26,309,191
Community, Large Wat				21,074,223
Supervision				4,696,901
Equipment - Purchase				9,811,944
Tree Nursery Stations				420,990
Bow River Irrigation P				32,805,339
ENGINEERING SERVICE				
Surveys, Design, Soil				24,325,952
Supervision of Con				28,385,297
St. Mary Irrigation Pro				74,537,443
South Saskatchewan Ri				1,485,874
Assiniboine River Dyk				141,113
Shellmouth Dam and P				3,310,182
B.C. Reclamation and				4,119,094
Land Protection and R				4,776,879
Miscellaneous Projects				<u>\$270,250,969</u>
REVENUE:				
Community Pasture Operations				\$10,710,951
Irrigation Project Operation & General Revenue				5,381,981
				<u>\$16,092,932</u>

Date Due

APPENDIX IV
PFRA EXPENDITURES BY ACTIVITIES, 1935-64

ADMINISTRATION DIVISION

Ottawa and Regina Administration	\$ 3,357,164
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LAND USE SERVICE

Cultural Work - Soil Drifting, etc. (Exp. Farm Service)	4,966,394
Community Pastures - Construction, Operation and Maintenance	25,499,148
Movement of Settlers	227,841

WATER DEVELOPMENT SERVICE

Small Farm Projects	26,309,191
Community, Large Water Storage and Irrigation Projects	21,074,223
Supervision	4,696,901
Equipment - Purchase and Repairs, Service Depot	9,811,944
Tree Nursery Stations	420,990
Bow River Irrigation Project	32,805,339

ENGINEERING SERVICE

Surveys, Design, Soil Mechanics, Drainage Studies, Legal Surveys	
Supervision of Construction	24,325,952
St. Mary Irrigation Project	28,385,297
South Saskatchewan River Project	74,537,443
Assiniboine River Dyking	1,485,874
Shellmouth Dam and Portage Diversion	141,113
B.C. Reclamation and Development, including Lillooet Project	3,310,182
Land Protection and Reclamation, Manitoba and Eastern Canada	4,119,094
Miscellaneous Projects - Construction	4,776,879
	<u>\$270,250,969</u>

REVENUE:

Community Pasture Operations	\$10,710,951
Irrigation Project Operation & General Revenue	5,381,981
	<u>\$16,092,932</u>

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MAR 4 RETURN

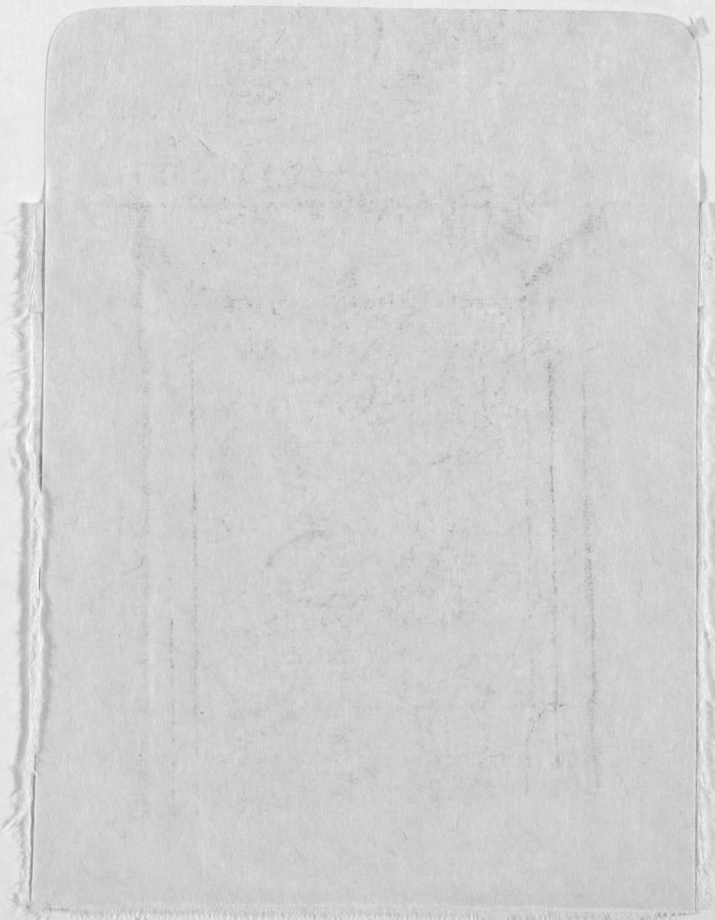
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MAR 7	RETURN
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HD 1781 A2 P8223 1963/1964
CANADA PRAIRIE FARM
REHABILITATION ADMINISTRATION
ANNUAL REPORT PRAIRIE FARM
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